

REMARKS

Claim Amendments

Claims 39-76 are pending and under current examination. Applicants have amended claims 39-41, 43, 44, 48, 57, 63-65, 67, 69, 73, and 74. The amendments to claims 39-41, 43, 44, 48, 57, 64, 65, 67, 69, and 74 are solely to improve form and clarity. Support for the amendments to claim 63 can be found in claim 39, and in the specification at, for example, p. 26, lines 24-32. Applicants have also rewritten allowable claim 73 into independent form including all of the features of the base claim and any intervening claims. No new matter has been added.

Office Action

Applicants respectfully traverse the rejections and objection in the Office Action, which:

- (a) rejected claims 39-42, 45, 46, and 63-65 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent App. Pub. No. 2004/0008965 ("Betty");
- (b) rejected claims 43 and 44 under 35 U.S.C. § 103(a) as being unpatentable over Betty in view of U.S. Patent No. 5,309,532 ("Chang");
- (c) rejected claims 58, 60, and 61 under 35 U.S.C. § 103(a) as being unpatentable over Betty in view of U.S. Patent No. 5,764,765 ("Phoenix"); and
- (d) rejected claims 66-72 under 35 U.S.C. § 103(a) as being unpatentable over Betty in view of U.S. Patent No. 5,778,113 ("Yu"); and
- (e) objected to claims 47-57, 59, 62, and 73-76 as being dependent upon a rejected base claim, but indicated that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Allowable Subject Matter

Applicants acknowledge with appreciation the Examiner's indication that claim 47-57, 59, 62, and 73-76 contain allowable subject matter. *See* Office Action, pp. 8-10. In response, Applicants have rewritten claim 73 into independent form including all of the features of the

base claim and all intervening claims. For the reasons discussed below, independent claims 39 and 63 should be allowable over the cited references. Therefore, Applicants respectfully decline to rewrite dependent claims 47-57, 59, 62, and 74-76 into independent form, and request withdrawal of the objection.

Rejection of Claims 39-42, 45, 46, and 63-65 under 35 U.S.C. § 102(b)

Applicants request reconsideration and withdrawal of the rejection of claims 39-42, 45, 46, and 63-65 under 35 U.S.C. § 102(b) as being anticipated by Betty. In order to establish anticipation under 35 U.S.C. § 102, the Office Action must show that each and every feature as set forth in the claims alleged to be anticipated is found, either expressly or inherently described, in Betty. See M.P.E.P. § 2131. Betty, however, does not disclose each and every feature of at least Applicants' independent claims 39 and 63.

Specifically, Betty does not disclose or suggest, among other things, the following features recited in independent claim 39 (with similar features recited in amended independent claim 63):

a first and a second waveguide arm connected to said optical splitter for receiving and transmitting therethrough said first and second light beams, respectively, said first and second waveguide arms each comprising a core region comprising a group IV semiconductor material or a combination of group IV semiconductor materials.

The Office Action relied on Betty's ¶ [0026] for its alleged disclosure of "wherein the group IV semiconductor material of each core region is selected from the group of Si and Ge and a combination thereof." Office Action, p. 3. The Office Action misinterpreted Betty's disclosure. Betty's ¶ [0026] instead discloses using "III-V alloys, InGaAsP/InP or AlGaAs/GaAs, as well as certain II-VI alloys" to form Mach-Zehnder interferometers 106 and 130. Betty, however, does not disclose or suggest --anywhere in its disclosure-- using a group IV

semiconductor material or a combination of group IV semiconductor materials to form the core regions of its waveguides 136a and 136b of Mach-Zehnder interferometer 130. One of ordinary skill in the art would have appreciated that the term “III-V alloy[]” as used in the art does not suggest the inclusion of a group IV semiconductor material in the alloy. In particular, none of the specific alloys recited in Betty includes as a component any group IV semiconductor materials (e.g. silicon or germanium), and Betty makes no mention of using any group IV semiconductor materials for any purpose. Betty therefore does not disclose at least Applicants’ claimed “first and second waveguide arms each comprising a core region comprising a group IV semiconductor material or a combination of group IV semiconductor materials,” as recited in independent claim 39 (and similarly in claim 63).

Accordingly, claim 39 should be allowable over Betty. Although of different scope, independent claim 63, as amended, recites features similar to the above-quoted features of claim 39, and therefore, should be allowable over Betty at least for reasons similar to those discussed above in connection with claim 39. In addition, dependent claims 40-42, 45, 46, 64, and 65 should also be allowable over Betty at least due to their respective dependence from base claim 39 or 63, and because they recite additional features not disclosed or suggested by Betty. Applicants therefore respectfully request withdrawal of the rejection.

Remaining Rejections under 35 U.S.C. § 103(a)

Applicants request reconsideration and withdrawal of the remaining rejections of claims 43, 44, 58, 60, 61, and 66-72 under 35 U.S.C. § 103(a) as being unpatentable over Betty in view of Chang, Phoenix, or Yu.

As discussed above, Betty does not teach or suggest “a first and a second waveguide arm . . . each comprising a core region comprising a group IV semiconductor material or a

combination of group IV semiconductor materials,” as recited in independent claim 39 (with similar features recited in amended independent claim 63).

Chang, Phoenix, and Yu, whether taken alone or in combination, do not cure the deficiencies of Betty. Chang discloses an “electro-optic intensity modulator with improved linearity.” Chang, Title. Chang, however, does not teach or suggest at least the above-quoted features of claim 39 (with similar features recited in amended claim 63). Thus, Chang does not cure the deficiencies of Betty.

Phoenix discloses a “method for key distribution using quantum cryptography.” Phoenix, Title. Phoenix, however, does not teach or suggest at least the above-quoted features of claim 39 (with similar features recited in amended claim 63). Thus, Phoenix does not cure the deficiencies of Betty and Chang.

Yu discloses a “configurable chirp Mach-Zehnder optical modulator.” Yu, Title. Yu, however, merely discloses fabricating “Mach-Zehnder modulators . . . [using] III-V material such as InP with multi-quantum wells of InP/InGaAsP in the guided regions.” Yu, col. 2, lines 18-20. For same reasons discussed in the previous section, Yu’s “III-V material” does not include “a group IV semiconductor material,” as recited in claims 39 and 63. Therefore, Yu fails to teach or suggest at least the above-quoted features of claim 39 (with similar features recited in amended claim 63). Accordingly, Yu does not cure the deficiencies of Betty, Chang, and Phoenix.

For at least the foregoing reasons, Betty, Chang, Phoenix, and Yu, whether taken alone or in any combination, do not teach or suggest each and every feature recited in independent claims 39 and 63. Accordingly, independent claims 39 and 63 should be allowable over the cited references. In addition, dependent claims 43, 44, 58, 60, 61, and 66-72 should be allowable over the cited references at least due to their respective dependence from base claim 39 or 63, and

because they recite additional features not taught or suggested by the cited references.

Applicants therefore request withdrawal of the remaining § 103(a) rejections.

Conclusion

Applicants respectfully request reconsideration of the application and withdrawal of the rejections and objection. The pending claims are in condition for allowance, and Applicants request a favorable action.

The Office Action contains a number of statements reflecting characterizations of the cited references and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any such statement or characterization.

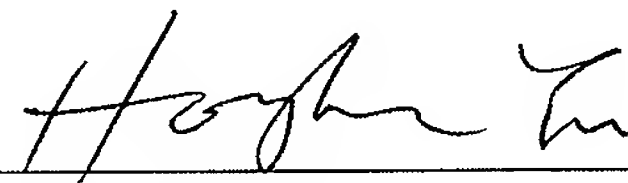
If there are any remaining issues or misunderstandings, Applicants request the Examiner telephone the undersigned representative to discuss them.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

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